

10/501270

DT04 Rec'd PCT/PTO 09 JUL 2004

**Amendments to the Claims**

This listing of claims will replace the originally filed claims in the application.

**Listing of Claims:**

Claims 1 – 21 (canceled).

Claim 22 (new): A method which may be used for cooling a stream of gaseous fluid comprising:

- a) confining said stream;
- b) slowing the flow rate of said fluid by increasing the cross section of said stream;
- c) spraying liquid nitrogen into said stream to cool said fluid; and
- d) recovering the cooled fluid.

Claim 23 (new): The method of claim 22, further comprising recovering said fluid only after said liquid nitrogen has completely vaporized in said stream.

Claim 24 (new): The method of claim 22, wherein said stream is cooled rapidly.

Claim 25 (new): The method of claim 22, wherein said cooling process begins with substantially little start up time.

Claim 26 (new): The method of claim 22, further comprising slowing the flow rate of said fluid by directing said stream toward an impact surface.

Claim 27 (new): The method of claim 22, further comprising stirring said stream after said spraying and before said recovering.

Claim 28 (new): The method of claim 27, further comprising stirring said stream with a turbomachine means.

Claim 29 (new): The method of claim 27, further comprising stirring said stream by deflection.

Claim 30 (new): The method of claim 22, further comprising regulating the temperature of said recovered fluid by adjusting the flow rate of said liquid nitrogen.

Claim 31 (new): The method of claim 22, wherein the temperature of said recovered fluid is about  $-150^{\circ}\text{C}$  to about  $-196^{\circ}\text{C}$ .

Claim 32 (new): A method which may be used to cool objects comprising:

- a) cooling a stream of gaseous fluid, wherein said cooling further comprises:
  - 1) confining said stream;
  - 2) slowing the flow rate of said fluid by increasing the cross section of said stream;
  - 3) spraying liquid nitrogen into said stream to cool said fluid; and
  - 4) recovering the cooled fluid; and
- b) applying said recovered fluid to said objects.

Claim 33 (new): The method of claim 32, wherein said objects comprise foodstuffs.

Claim 34 (new): The method of claim 33, wherein said foodstuffs comprise chocolate.

Claim 35 (new): The method of claim 32, further comprising recovering said fluid only after said liquid nitrogen has completely vaporized in said stream.

Claim 36 (new): The method of claim 32, further comprising recovering said fluid only after said liquid nitrogen has completely vaporized in said stream.

Claim 37 (new): The method of claim 32, wherein said gaseous fluid comprises air.

Claim 38 (new): The method of claim 32, wherein the temperature of said recovered fluid is about  $-150^{\circ}\text{C}$  to about  $-196^{\circ}\text{C}$ .

Claim 39 (new): An apparatus which may be used for cooling a stream of gaseous fluid comprising:

- a) a mixing area through which said stream passes;
- b) at least one impact surface located inside said area; and
- c) a means for spraying liquid nitrogen into said area, said spraying means further comprising an injection zone for injecting said fluid into said area, wherein said injection zone has a cross section smaller than that of the portion of said area containing said impact surface and said spraying means.

Claim 40 (new): The apparatus of claim 39, wherein said spraying means further comprises a spray nozzle which discharges into said mixing area in substantially the fluid flow direction.

Claim 41 (new): The apparatus of claim 39, wherein said injection zone is located in the upstream end of said mixing area.

Claim 42 (new): The apparatus of claim 39, wherein said impact surface substantially faces the upstream end of said mixing area.

Claim 43 (new): The apparatus of claims 39, wherein said impact surface is concave.

Claim 44 (new): The apparatus of claim 39, further comprising a means for stirring said gaseous fluid, said stirring means located downstream of said spraying means.

Claim 45 (new): The method of claim 39, wherein the temperature of said recovered fluid is about  $-150^{\circ}\text{C}$  to about  $-196^{\circ}\text{C}$ .

Claim 46 (new): The apparatus of claim 44, further comprising:

- a) a chamber into which the downstream end of said mixing area discharges;
- b) a calming passage for said gaseous fluid defined by said chamber and said area; and
- c) a chamber exit for said fluid located at substantially the same level as said calming passage.

Claim 47 (new): The apparatus of claim 46, wherein said stirring means is located upstream of said calming passage.

Claim 48 (new): The apparatus of claim 46, wherein the upstream end of said mixing area is open and located in said chamber.

Claim 49 (new): The apparatus of claim 46, further comprising a suction means located downstream of said spraying means and upstream of said exit, wherein said suction means is able to drive said gaseous fluid in said flow direction.

Claim 50 (new): The apparatus of claim 49, wherein a turbomachine is common to said stirring means and said suction means.

Claim 51 (new): The apparatus of claim 50, wherein said turbomachine comprises a centrifugal fan located at the downstream end of said mixing area, wherein said fan is able to draw in said gaseous fluid flowing in said mixing area.

Claim 52 (new): The apparatus of claim 39, further comprising a regulation loop for regulating the outlet temperature of said gaseous fluid leaving said cooling device to a preset temperature, said regulation loop comprising:

- a) a means for measuring said outlet temperature;
- b) a means for adjusting the flow rate of nitrogen supplied to said spraying means, and
- c) an actuator, wherein said actuator receives a signal from said measuring means and actuates said adjusting means.

Claim 53 (new): An apparatus which may be used for cooling foodstuffs with a stream of gaseous fluid comprising:

- a) a mixing area through which said stream passes;
- b) at least one impact surface located inside said area; and
- c) a means for spraying liquid nitrogen into said area, said spraying means further comprising an injection zone for injecting said fluid into said area, wherein said injection zone has a cross section smaller than that of the portion of said area containing said impact surface and said spraying means.

Claim 54 (new): The method of claim 43, wherein the temperature of said recovered fluid is about  $-150^{\circ}\text{C}$  to about  $-196^{\circ}\text{C}$ .